

Application No. 09/404,570

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

1. (Cancelled)
2. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 wherein the ink has a melting point of no lower than about 60°C and no higher than about 140°C.
3. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 wherein the ink has a melt viscosity at jetting temperature of no higher than about 25 centipoise.
4. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 wherein the ink undergoes, upon heating, a change from a solid state to a liquid state in a period of no more than about 100 milliseconds.
5. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 wherein the ink exhibits an acoustic-loss value of no more than about 100 decibels per millimeter.

Application No. 09/404,570

6. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 wherein the ink exhibits a conductivity of no less than about $6 \log(\text{picomho/cm})$.

7. (Currently amended) ~~An~~ A hot melt ink composition according to claim 1 comprising (a) an aldehyde copolymer ink vehicle, (b) a nonpolymeric aldehyde viscosity modifier, (c) a colorant, (d) an optional conductivity enhancing agent, (e) an optional antioxidant, and (f) an optional UV absorber, wherein images generated with the ink exhibit a haze value of no more than about 25.

8. (Currently amended) An ink composition according to ~~claim 1~~ claim 7 wherein the aldehyde copolymer ink vehicle is poly ((phenyl glycidyl ether)-co-formaldehyde), poly ((o-cresyl glycidyl ether)-co-formaldehyde), poly (p-toluenesulfonamide-co-formaldehyde), or mixtures thereof.

9. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 wherein the ink vehicle is present in the ink in an amount of no less than about 1 percent by weight of the ink and no more than about 25 percent by weight of the ink.

Application No. 09/404,570

10. (Currently amended) ~~AN~~ A hot melt ink composition according to claim 1 comprising (a) an aldehyde copolymer ink vehicle, (b) a nonpolymeric aldehyde viscosity modifier, (c) a colorant, (d) an optional conductivity enhancing agent, (e) an optional antioxidant, and (f) an optional UV absorber, wherein the nonpolymeric aldehyde viscosity modifier is 3-hydroxy benzaldehyde, 4-hydroxy benzaldehyde, 4-benzyloxy benzaldehyde, 2-carboxy benzaldehyde, 4-nitro benzaldehyde, 2,3-dihydroxy benzaldehyde, 2,5-dihydroxy benzaldehyde, 3-hydroxy-4-methoxy benzaldehyde, 4-hydroxy-3-methoxy benzaldehyde, 4-hydroxy-3-ethoxy benzaldehyde, 4-hydroxy-3-methyl benzaldehyde, 2-hydroxy-5-nitrobenzaldehyde, 3-hydroxy-4-nitrobenzaldehyde, 4-hydroxy-3-nitrobenzaldehyde, 3,4-dibenzyloxy benzaldehyde, 3,5-dibenzyloxy benzaldehyde, 4-acetoxy-3,5-dimethoxy benzaldehyde, 2-amino-3,5-dibromo benzaldehyde, 2-benzyloxy-4,5-dimethoxy benzaldehyde, 5-bromo-2-hydroxy-3-methoxy benzaldehyde, 4-hydroxy-3,5-dimethoxy benzaldehyde, 2,3,5-trichlorobenzaldehyde, 2,3,6-trichlorobenzaldehyde, 2,4,5-trimethoxy benzaldehyde, 2,4,6-trimethoxy benzaldehyde, 3,5-dichloro-2-hydroxybenzaldehyde, 3,5-dibromo-2-hydroxy-benzaldehyde, 3,5-diiodo-2-hydroxy-benzaldehyde, 3,4-dihydroxy-5-methoxy benzaldehyde, 3,5-dimethyl-4-hydroxy benzaldehyde, 2,6-dimethoxybenzaldehyde, 2-nitro cinnamaldehyde, 4-(diethylamino) cinnamaldehyde, 4-acetoxy-3-methoxy cinnamaldehyde, 4-hydroxy-3-methoxy cinnamaldehyde, 2-hydroxy-1-naphthaldehyde, 2-methoxy-1-naphthaldehyde, 9-anthraldehyde, 5-bromo-2-furaldehyde, 5-nitro-2-thiophene carboxaldehyde, 9-ethyl-3-carbazole carboxaldehyde, 4-stillbene

Application No. 09/404,570

carboxaldehyde, 2-hydroxy-5-methyl-1,3-benzene dicarboxaldehyde, terephthal dicarboxaldehyde, 2-(diphenylphosphino) benzaldehyde, 1-(phenylsulfonyl)-2-pyrrolicarboxaldehyde, 1-pyrene carboxaldehyde, phenanthrene carboxaldehyde, 2-fluorene carboxaldehyde, or mixtures thereof.

11. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 wherein the viscosity modifier is present in the ink in an amount of no less than about 5 percent by weight of the ink and no more than about 95 percent by weight of the ink.

12. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 wherein the colorant is a dye.

13. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 wherein the colorant is a pigment.

14. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 containing a conductivity enhancing agent which is a complex of a dianiline and a phosphorus-containing acid.

Application No. 09/404,570

15. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 containing a conductivity enhancing agent which is a complex of (a) a material which is 2,2'-dithio dianiline, 4,4'-dithiodianiline, 3,3'-methylene dianiline, 4,4'-methylene dianiline, N-methyl-4,4'-methylene dianiline, 4,4'-methylene bis(2,6-diethyl aniline), 4,4'-methylene bis(2,6-diisopropyl-N,N-dimethylaniline), 4,4'-methylene bis(N,N-dimethylaniline), 4,4'-methylene bis(2,6-dimethylaniline), 4,4'-methylene bis(3-chloro-2,6-diethylaniline), 3,3'-(sulfonyl bis(4,1-phenylene))dianiline, 4,4'-(1,3-phenylene diisopropylidene) bisaniline, or mixtures thereof, and (b) a material which is phenylphosphinic acid, dimethylphosphinic acid, methyl phosphonic acid, or mixtures thereof.

16. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 containing a conductivity enhancing agent in an amount of no less than about 2 percent by weight of the ink and no more than about 50 percent by weight of the ink.

17. (Currently amended) An ink composition according to ~~claim 1~~ claim 23 containing an antioxidant in an amount of no less than about 0.25 percent by weight of the ink and no more than about 10 percent by weight of the ink.

Application No. 09/404,570

18. (Currently amended) A printing process which comprises incorporating an ink according to ~~claim 1~~ claim 23 into an ink jet printing apparatus, melting the ink, and causing droplets of the melted ink to be ejected in an imagewise pattern onto a recording sheet.

19. (Previously presented) A process according to claim 18 wherein the printing apparatus employs an acoustic ink jet process, wherein droplets of the ink are caused to be ejected in imagewise pattern by acoustic beams.

20. (Previously presented) A process according to claim 18 wherein the printing apparatus employs an acoustic ink jet printing process wherein droplets of the ink are formed by acoustic beams without imparting a substantial velocity component toward the print medium, using a droplet forming force that is sufficient only to form the ink droplets, and wherein the printing process further comprises generating an electric field to exert an electrical force different from the droplet forming force on the ink droplets to move the ink droplets toward the print medium, and controlling the electrical force exerted on the formed complete ink droplets by the electric field.

Application No. 09/404,570

21. (Currently amended) A hot melt ink composition consisting essentially of (a) an aldehyde copolymer ink vehicle, (b) a nonpolymeric aldehyde viscosity modifier having a melting point of no less than about 65°C, (c) a colorant, (d) an optional conductivity enhancing agent, (e) an optional antioxidant, and (f) an optional UV absorber, wherein the aldehyde copolymer ink vehicle is poly ((phenyl glycidyl ether)-co-formaldehyde), poly ((o-cresyl glycidyl ether)-co-formaldehyde), or mixtures thereof.

22. (Previously presented) A hot melt ink composition consisting of (a) an aldehyde copolymer ink vehicle, (b) a nonpolymeric aldehyde viscosity modifier having a melting point of no less than about 65°C, (c) a colorant, (d) an optional conductivity enhancing agent, (e) an optional antioxidant, and (f) an optional UV absorber.

23. (Currently amended) ~~An~~ A hot melt ink composition according to claim 1 comprising (a) an aldehyde copolymer ink vehicle, (b) a nonpolymeric aldehyde viscosity modifier, (c) a colorant, (d) an optional conductivity enhancing agent, (e) an optional antioxidant, and (f) an optional UV absorber, wherein the aldehyde copolymer ink vehicle is poly ((phenyl glycidyl ether)-co-formaldehyde), poly ((o-cresyl glycidyl ether)-co-formaldehyde), or mixtures thereof.

Application No. 09/404,570

24. (Currently amended) ~~An~~ A hot melt ink composition according to claim 1 comprising (a) an aldehyde copolymer ink vehicle, (b) a nonpolymeric aldehyde viscosity modifier, (c) a colorant, (d) an optional conductivity enhancing agent, (e) an optional antioxidant, and (f) an optional UV absorber, wherein the aldehyde copolymer ink vehicle is poly ((phenyl glycidyl ether)-co-formaldehyde), poly ((o-cresyl glycidyl ether)-co-formaldehyde), poly (p-toluenesulfonamide-co-formaldehyde), or mixtures thereof and wherein the nonpolymeric aldehyde viscosity modifier is 3-hydroxy benzaldehyde, 4-hydroxy benzaldehyde, 4-benzyloxy benzaldehyde, 2-carboxy benzaldehyde, 4-nitro benzaldehyde, 2,3-dihydroxy benzaldehyde, 2,5-dihydroxy benzaldehyde, 3-hydroxy-4-methoxy benzaldehyde, 4-hydroxy-3-methoxy benzaldehyde, 4-hydroxy-3-ethoxy benzaldehyde, 4-hydroxy-3-methyl benzaldehyde, 2-hydroxy-5-nitrobenzaldehyde, 3-hydroxy-4-nitrobenzaldehyde, 4-hydroxy-3-nitrobenzaldehyde, 3,4-dibenzyloxy benzaldehyde, 3,5-dibenzyloxy benzaldehyde, 4-acetoxy-3,5-dimethoxy benzaldehyde, 2-amino-3,5-dibromo benzaldehyde, 2-benzyloxy-4,5-dimethoxy benzaldehyde, 5-bromo-2-hydroxy-3-methoxy benzaldehyde, 4-hydroxy-3,5-dimethoxy benzaldehyde, 2,3,5-trichlorobenzaldehyde, 2,3,6-trichlorobenzaldehyde, 2,4,5-trimethoxy benzaldehyde, 2,4,6-trimethoxy benzaldehyde, 3,5-dichloro-2-hydroxybenzaldehyde, 3,5-dibromo-2-hydroxybenzaldehyde, 3,5-diiodo-2-hydroxybenzaldehyde, 3,4-dihydroxy-5-methoxy benzaldehyde, 3,5-dimethyl-4-hydroxy benzaldehyde, 2,6-dimethoxybenzaldehyde, 2-nitro cinnamaldehyde, 4-(diethylamino) cinnamaldehyde, 4-acetoxy-3-methoxy cinnamaldehyde, 4-hydroxy-3-methoxy cinnamaldehyde, 2-

Application No. 09/404,570

hydroxy-1-naphthaldehyde, 2-methoxy-1-naphthaldehyde, 9-anthraldehyde, 5-bromo-2-furaldehyde, 5-nitro-2-thiophene carboxaldehyde, 9-ethyl-3-carbazole carboxaldehyde, 4-stillbene carboxaldehyde, 2-hydroxy-5-methyl-1,3-benzene dicarboxaldehyde, terephthal dicarboxaldehyde, 2-(diphenylphosphino) benzaldehyde, 1-(phenylsulfonyl)-2-pyrrolecarboxaldehyde, 1-pyrene carboxaldehyde, phenanthrene carboxaldehyde, 2-fluorene carboxaldehyde, or mixtures thereof.

25. (New) An ink composition according to claim 7 wherein the ink has a melting point of no lower than about 60°C and no higher than about 140°C.

26. (New) An ink composition according to claim 7 wherein the ink has a melt viscosity at jetting temperature of no higher than about 25 centipoise.

27. (New) An ink composition according to claim 7 wherein the ink undergoes, upon heating, a change from a solid state to a liquid state in a period of no more than about 100 milliseconds.

28. (New) An ink composition according to claim 7 wherein the ink exhibits an acoustic-loss value of no more than about 100 decibels per millimeter.

Application No. 09/404,570

29. (New) An ink composition according to claim 7 wherein the ink exhibits a conductivity of no less than about 6 log(picomho/cm).

30. (New) An ink composition according to claim 7 wherein the ink vehicle is present in the ink in an amount of no less than about 1 percent by weight of the ink and no more than about 25 percent by weight of the ink.

31. (New) An ink composition according to claim 7 wherein the viscosity modifier is present in the ink in an amount of no less than about 5 percent by weight of the ink and no more than about 95 percent by weight of the ink.

32. (New) An ink composition according to claim 7 wherein the colorant is a dye.

33. (New) An ink composition according to claim 7 wherein the colorant is a pigment.

34. (New) An ink composition according to claim 7 containing a conductivity enhancing agent which is a complex of a dianiline and a phosphorus-containing acid.

Application No. 09/404,570

35. (New) An ink composition according to claim 7 containing a conductivity enhancing agent which is a complex of (a) a material which is 2,2'-dithio dianiline, 4,4'-dithiodianiline, 3,3'-methylene dianiline, 4,4'-methylene dianiline, N-methyl-4,4'-methylene dianiline, 4,4'-methylene bis(2,6-diethyl aniline), 4,4'-methylene bis(2,6-diisopropyl-N,N-dimethylaniline), 4,4'-methylene bis (N,N-dimethylaniline), 4,4'-methylene bis (2,6-dimethylaniline), 4,4'-methylene bis (3-chloro-2,6-diethylaniline), 3,3'-(sulfonyl bis(4,1-phenylene))dianiline, 4,4'-(1,3-phenylene diisopropylidene) bisaniline, or mixtures thereof, and (b) a material which is phenylphosphinic acid, dimethylphosphinic acid, methyl phosphonic acid, or mixtures thereof.

36. (New) An ink composition according to claim 7 containing a conductivity enhancing agent in an amount of no less than about 2 percent by weight of the ink and no more than about 50 percent by weight of the ink.

37. (New) An ink composition according to claim 7 containing an antioxidant in an amount of no less than about 0.25 percent by weight of the ink and no more than about 10 percent by weight of the ink.

38. (New) A printing process which comprises incorporating an ink according to claim 7 into an ink jet printing apparatus, melting the ink, and causing droplets of the melted ink to be ejected in an imagewise pattern onto a recording sheet.

Application No. 09/404,570

39. (New) A process according to claim 38 wherein the printing apparatus employs an acoustic ink jet process, wherein droplets of the ink are caused to be ejected in imagewise pattern by acoustic beams.

40. (New) A process according to claim 38 wherein the printing apparatus employs an acoustic ink jet printing process wherein droplets of the ink are formed by acoustic beams without imparting a substantial velocity component toward the print medium, using a droplet forming force that is sufficient only to form the ink droplets, and wherein the printing process further comprises generating an electric field to exert an electrical force different from the droplet forming force on the ink droplets to move the ink droplets toward the print medium, and controlling the electrical force exerted on the formed complete ink droplets by the electric field.

41. (New) An ink composition according to claim 10 wherein the ink has a melting point of no lower than about 60°C and no higher than about 140°C.

42. (New) An ink composition according to claim 10 wherein the ink has a melt viscosity at jetting temperature of no higher than about 25 centipoise.

Application No. 09/404,570

43. (New) An ink composition according to claim 10 wherein the ink undergoes, upon heating, a change from a solid state to a liquid state in a period of no more than about 100 milliseconds.

44. (New) An ink composition according to claim 10 wherein the ink exhibits an acoustic-loss value of no more than about 100 decibels per millimeter.

45. (New) An ink composition according to claim 10 wherein the ink exhibits a conductivity of no less than about 6 log(picomho/cm).

46. (New) An ink composition according to claim 10 wherein the ink vehicle is present in the ink in an amount of no less than about 1 percent by weight of the ink and no more than about 25 percent by weight of the ink.

47. (New) An ink composition according to claim 10 wherein the viscosity modifier is present in the ink in an amount of no less than about 5 percent by weight of the ink and no more than about 95 percent by weight of the ink.

48. (New) An ink composition according to claim 10 wherein the colorant is a dye.

Application No. 09/404,570

49. (New) An ink composition according to claim 10 wherein the colorant is a pigment.

50. (New) An ink composition according to claim 10 containing a conductivity enhancing agent which is a complex of a dianiline and a phosphorus-containing acid.

51. (New) An ink composition according to claim 10 containing a conductivity enhancing agent which is a complex of (a) a material which is 2,2'-dithio dianiline, 4,4'-dithiodianiline, 3,3'-methylene dianiline, 4,4'-methylene dianiline, N-methyl-4,4'-methylene dianiline, 4,4'-methylene bis(2,6-diethyl aniline), 4,4'-methylene bis(2,6-diisopropyl-N,N-dimethylaniline), 4,4'-methylene bis (N,N-dimethylaniline), 4,4'-methylene bis (2,6-dimethylaniline), 4,4'-methylene bis (3-chloro-2,6-diethylaniline), 3,3'-(sulfonyl bis(4,1-phenylene))dianiline, 4,4'-(1,3-phenylene diisopropylidene) bisaniline, or mixtures thereof, and (b) a material which is phenylphosphinic acid, dimethylphosphinic acid, methyl phosphonic acid, or mixtures thereof.

52. (New) An ink composition according to claim 10 containing a conductivity enhancing agent in an amount of no less than about 2 percent by weight of the ink and no more than about 50 percent by weight of the ink.

Application No. 09/404,570

53. (New) An ink composition according to claim 10 containing an antioxidant in an amount of no less than about 0.25 percent by weight of the ink and no more than about 10 percent by weight of the ink.

54. (New) A printing process which comprises incorporating an ink according to claim 10 into an ink jet printing apparatus, melting the ink, and causing droplets of the melted ink to be ejected in an imagewise pattern onto a recording sheet.

55. (New) A process according to claim 54 wherein the printing apparatus employs an acoustic ink jet process, wherein droplets of the ink are caused to be ejected in imagewise pattern by acoustic beams.

56. (New) A process according to claim 54 wherein the printing apparatus employs an acoustic ink jet printing process wherein droplets of the ink are formed by acoustic beams without imparting a substantial velocity component toward the print medium, using a droplet forming force that is sufficient only to form the ink droplets, and wherein the printing process further comprises generating an electric field to exert an electrical force different from the droplet forming force on the ink droplets to move the ink droplets toward the print medium, and controlling the electrical force exerted on the formed complete ink droplets by the electric field.